

Panasonic

ideas for life

2007

DIGITAL VIDEO CAMERA



Panasonic Video Cameras Feature 3CCD & Optical Image Stabiliser (O.I.S.)

That's why the images are so spectacular on a large-screen TV!

3CCD & O.I.S.


















































To fully enjoy viewing your own moving video images on a large-screen TV, you need a camera with optical image stabilisation. Panasonic's O.I.S. system eliminates blurring caused by shaky hands, so both the subject and background are clear and crisp. A 3CCD camera can capture beautiful images with vivid colours. Make sure the images are sharp and blur-free too, with O.I.S.

ZOOM & O.I.S.



A powerful zoom lets you take remarkable outdoor shots and close-ups, but zooming tends to increase the blurring caused by hand-shake. That's where O.I.S. (Optical Image Stabiliser) comes in. O.I.S. minimises hand-shake at all times, even when zooming, so you get crisp, clear close-ups of smiling faces. With O.I.S., your pictures look spectacular on a large-screen TV.

Record in High Definition or Standard Definition, across multiple Formats.
There's a Panasonic Camera that's just right for your style of shooting.

	HIGH DEFINITION	STANDARD DEFINITION	
	Beautiful Images with Vibrant Colour and Super-Fine Detail: 3CCD Models	Powerful Zooming with No Loss of Image Quality: High-Powered Optical Zoom Models	
Compact and Durable  *2 SDHC/SD Memory Card <ul style="list-style-type: none"> •Never a need to fast-forward or rewind •Compact size for easy portability •Durable – stands up to rough environmental conditions 	SD1 P4  AVCHD      		
Extended Recording Time  *2  SDHC/SD Memory Card + HDD <ul style="list-style-type: none"> •Up to 27 hours of recording •Can record on SDHC/SD Memory Cards 		H250 P8  30GB HDD     	H20 P8  30GB HDD 32x Optical Zoom   
Easy Recording and Viewing  8cm DVD <ul style="list-style-type: none"> •Never a need to fast-forward or rewind •Immediate viewing – no cables to connect •Discs are easy to store and organise 	DX1 P4  AVCHD      	D310 P10      	D220 P10  32x Optical Zoom    D160 P10  30x Optical Zoom  
Viewing of Archived Video Tapes  DVC <ul style="list-style-type: none"> •Records on easy-to-use tape 		GS230 P11    	GS60 P11  30x Optical Zoom 

*1 The term full HD as applied to Panasonic video cameras for home use refers to images recorded with 1,080 vertical pixels (interlaced scanning lines).
*2 Usable capacity will be less.



Incredible Picture and Sound Quality that Makes Videos More Fun to Watch

A Panasonic HD video camera captures images that look so real, you want to reach out and touch them. And models with Dolby 5.1-channel surround add a sound that's so real and three-dimensional, you feel like you're right in the scene. With a Panasonic HD video camera, breathtaking images and clear, true-to-life sound combine to deliver the ultimate video recording and viewing experience.



HDC-SD1

AVCHD

*1



Included!



3.0" WIDE LCD



HD Crystal Engine

12x Optical Zoom

HDC-DX1

AVCHD



3.0" WIDE LCD



HD Crystal Engine

12x Optical Zoom

*1 Usable capacity will be less. *2 The term full HD as applied to Panasonic video cameras for home use refers to images recorded with 1,080 vertical pixels (interlaced scanning lines). •The Panasonic batteries that can be used with these units are VW-VBG130 (for SD1) and VW-VBG260 (for DX1). •The remaining battery capacity is displayed in minutes when using the Panasonic battery that you can use for this unit. •When using batteries made by other companies the remaining battery capacity will not be shown. •We cannot accept any liability whatsoever for damages to the unit or accidents caused by non-genuine Panasonic batteries (including those that have been certified by Panasonic).

Panasonic Imaging Technologies Take HD to a Beautiful New Level

3CCD Rich, vivid colours bring out all the beauty of high definition

HD is especially good for scenes with rich, vibrant colours. And Panasonic HD video cameras provide the best in colour reproduction, thanks to use of an advanced 3CCD camera system. This system, in which three separate CCDs capture and process the light information received through the lens, helps reproduce high-resolution HD images with magnificent colour.



1CCD The baby's skin and coloured balls don't look natural, they look artificial.

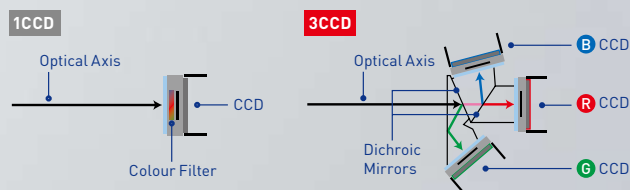


3CCD Both baby's skin and coloured balls have natural colour and look real.



3CCD Camera System

Most professional broadcast cameras use the 3CCD camera system, with its superior colour reproduction. In a 1CCD system, all of the incoming light information is processed by the same CCD. The more advanced 3CCD system uses three distinct CCDs for processing, so there is absolutely no light loss. The 3CCD camera system draws out the full potential of HD image quality.



O.I.S. Suppresses camera shake, so images appear sharp, even on a big-screen TV

Imagine taking video shots on a moving boat and then viewing them on a large-screen TV. They're likely to appear blurry from the boat's movement and unsteady hands. Panasonic solves this problem with our O.I.S. (Optical Image Stabiliser). If you plan to view the videos you record on a big-screen TV, be sure to get a camera with an O.I.S. system.



O.I.S. OFF The picture is blurry because the video photographer's hands shook a little.



O.I.S. ON Even images shot from a moving boat are clear and beautiful.



O.I.S. (Optical Image Stabiliser)

Panasonic's O.I.S. minimises hand-shake. O.I.S. is extremely effective in situations where hand-shake is most often a problem, such as with zoom shots. The system is optical, so there is no quality loss. Images look clear and beautiful on a TV screen.

O.I.S. Lens



The lens moves up/down or left/right and bends the incoming light to correct hand-shake.

50" Display (O.I.S. OFF)



When you're shooting, moving the camera even a tiny bit - just 0.3 mm - results in an image blur of 50 mm when the recording is viewed on a 50-inch screen.

BLURRY!!

LEICA DICOMAR Lens Exceptional Leica-certified image quality for truly beautiful HD video images

The lens is like the camera's eye - it's the first device that "sees" the subject. If you want to capture truly lifelike HD images you need to start with a superior lens. That's why Panasonic HD video cameras come equipped with a Leica Dicomar lens. This advanced lens system renders finely detailed, high-resolution images that unleash the full potential of HD technology.



Washed-out image due to strong light



Multi-coated lens: clear image with no colour bleeding



Leica Dicomar lens

The DX1 and the SD1 boast a Leica Dicomar lens. Developed specifically for HD digital video cameras, these lens systems are made using a multi-coating process that prevents light reflection and glare, which can make colours bleed and images appear washed out. It also helps prevent ring of light, or "ghosts."



*Leica is a registered trademark of Leica Microsystems IR GmbH, and Dicomar is a registered trademark of Leica Camera AG.

High-Definition Images

HD images contain 4 times as much information as conventional standard-definition images. HDTV has 1,080 horizontal scan lines, SDTV has 576. That translates into much higher resolution and much finer detail.

AVCHD

AVCHD is a standard developed jointly by Sony and Panasonic for HD video cameras. Using highly efficient codec technologies, it records 1080i high-definition signals onto media such as 8-cm DVD discs and SDHC/SD Memory Cards.



Panasonic Sound Technologies Take HD Audio Realism to a Dynamic New Level

5 Microphones and 5.1-Channel Surround Sound Capturing voices over a wide area for lifelike sound

The festival is really starting to rock. The guitars are out. People are singing. At times like this, you want to record the best sound possible. Panasonic high-definition video cameras let you do this with five built-in microphones. They capture sounds from just about anywhere. And they record in 5.1-channel surround, so you get a truly lifelike sound on a Dolby Digital 5.1-channel system.



5 Microphones and 5.1-Channel Surround Sound

Panasonic high-definition video cameras have five electret condenser microphones, one each to capture sounds from the front, back, right, left and centre. The centre mic helps capture the sound source and distance more accurately. This provides a more 3-dimensional effect than conventional systems, which capture all sounds from the front. It creates a true-to-life sound space that's a great match for the HD image quality.

*Manufactured under license from Dolby Laboratories. Dolby and the double-D symbol are registered trademarks of Dolby Laboratories.



Five electret condenser microphones



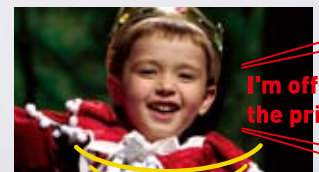
Five mics capture each of the sounds from the different sound source directions.

Zoom Microphone Bring distant sounds right up close

When you zoom in to a performer on stage, you want the sound to zoom in at the same time. Panasonic high-definition video cameras do exactly that, linking the microphone zoom with the lens zoom. With this innovative feature, voices come through loud and clear even when you're using the zoom to record someone at a distance.

Zoom Microphones

In Zoom mode the microphones are linked to the lens action. When you zoom in on a subject, the microphones focus on the sound in that same direction, minimising the capture of incidental sounds. This level of sound localisation — made possible by the five-mic configuration — is ideal for shooting a scene onstage or a conversation.



I'm off to save the princess!

Every Scene Deserves The Beauty of High Definition

HD Crystal Engine developed specifically for high-resolution HD video cameras



The HD Crystal Engine is a special image processing circuit for the 3CCD HD video camera. Able to process large amounts of data with high speed and precision, this engine achieves truly superb colour reproduction for high-quality pictures.



Without HD Crystal Engine: picture noise



With HD Crystal Engine: smooth from corner to corner

*1 Usable capacity will be less.

High 6lux sensitivity for sharp, clear images even in dim lighting

The pixels are more than twice the ordinary size, so you can shoot in light as low as 6 lux. You get natural-looking shots even in dim rooms or at dusk. And with Panasonic's O.I.S. to fight blurring due to hand-shake, the images are clear.



This would be a nice shot — but it's too dark to see.

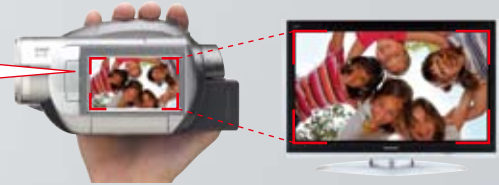


High 6Lux Sensitivity captures great shots even by candlelight.

Large 3.0" Wide-Screen LCD makes it easy to picture how images will look on a TV

The large, 3-inch LCD monitor displays bright, clear images with 250,000-pixel resolution. You can see even tiny details. It's more fun to shoot and view images on a wide monitor, and it's easier to picture just how the images will look on a TV screen.

Large, easy-to-view LCD screen



Composition Guide Lines to help you take level shots

With wide LCD monitors, it's hard to keep images perfectly level. The DX1 and SD1 solve this by displaying horizontal and vertical Composition Guide Lines that make it easy to keep the subject straight and level.



It's hard to get level shots when using a wide LCD monitor.



Images are level, with no slanted horizontal lines.

Focus Assist for more accurate manual focusing

This function enlarges the centre of the image, making it easier for you to get a clear, sharp shot when focusing manually.



Enlarged image centre makes it easier to focus

A clear, perfectly focused shot!

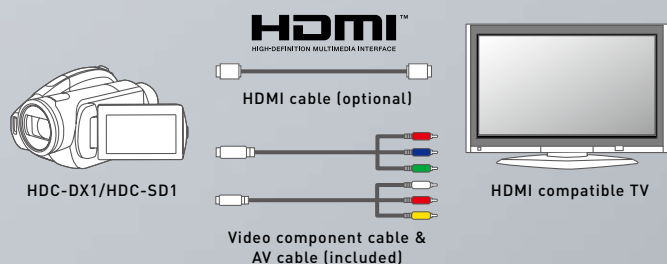
Enjoy High-Definition Video and Superb Sound on an HD Home Cinema

Easy playback for TV viewing

•Connecting with a cable

Just connect your video camera to an HDTV and you're ready for high-definition viewing. If your TV is HDMI* compatible, a single HDMI cable is all you need. When using a video component cable, you need a separate audio cable.

*HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.



•Using a Blu-ray Disc player (for DVD)

Simply take the DVD disc from the camera and slip it into the Blu-ray Disc player. There are no cables to connect. It's that easy.

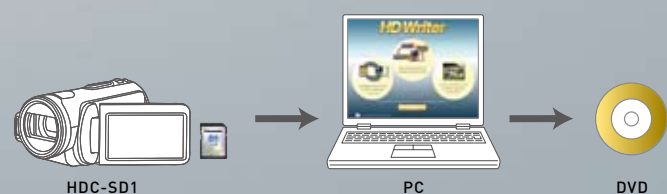
* The disc must be finalised prior to playback.

* When using an SDHC/SD Memory Card: Use the included software to burn the images to a DVD disc, then use the disc in the Blu-ray Disc player. Software available in PC version only at this time.



Archiving on DVD (HDC-SD1)

The included software HD Writer Ver 1.0E lets you burn images from an SDHC/SD Memory Card to a DVD disc. Just download the images from the memory card to a PC, then follow the software instructions. When finished, you can use the DVD disc right away in a Blu-ray Disc player.





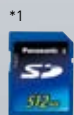
Perfect for Taking on a Trip or Recording Long Events

The internal 30-GB hard disk drive holds as much video data as about 22 8-cm DVD discs. That means you can record for around 27 hours without changing a disc, tape or anything else. This Hard Disk/SD Card video camera is perfect for people who want to shoot for hour after hour without worrying about memory space.



SDR-H250

30GB HDD



Included!



2.7" WIDE LCD

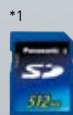


Crystal Engine

10x Optical Zoom

SDR-H20

30GB HDD



Included!



2.7" WIDE LCD



Pure Colour Engine

32x Optical
Zoom

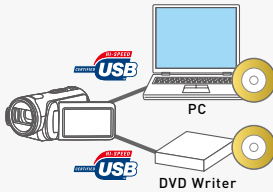
*1 Usable capacity will be less.

Panasonic's Hard Disk/SD Card Video Camera: Hours of Recording and Easy, Reliable Operation



30-GB*1 hard disk holds up to 27 hours

Holding as much data as 22 DVD discs, the internal hard disk lets you record continuously for up to 27 hours*2 without changing a disc, tape or other recording media.
*1 A 30GB hard disk utilises a portion of the storage space for formatting and other purposes. Usable capacity will be less. 1 GB means 1,000,000,000 bytes." *2 In LP mode



One-touch copying onto a DVD

Connect the camera to a USB port on your PC, and you can copy your video data onto a 12-cm DVD disc by pressing a single button. You don't have to do anything to the PC. Likewise, connect the camera to a DVD writer and pressing one button is all it takes to copy data to a DVD disc.

Anti-Shock Shield: Helps protect recorded video data from damage due to jolts and impact



1 The Drop Detect function senses if the camera is falling and moves the head away from the hard disk.



2 The Floating Structure protects the hard disk should the camera fall or be dropped.



3 The Buffer Memory automatically backs up data, while the camera is falling.



Advanced Technologies that Record Clear, Crisp Pictures onto a Hard Disk Drive for More Video Fun

Triple beauty - remarkable colour, detail and gradation 3CCD Camera System

SDR-H250



Most professional broadcast cameras use the 3CCD system. In a 1CCD system, all of the incoming light information is processed by the same CCD. The more advanced 3CCD system uses three distinct CCDs for processing, so there is absolutely no light loss. You can see the results in beautifully rendered images with vivid colour, fine detail, and rich gradation.



Functions you need to prevent blurring in high-power zoom shots O.I.S. (Optical Image Stabiliser)



Panasonic's O.I.S. minimises the hand-shake that can be such a problem with handheld shots. Because the system is optical, there is no image quality degradation.



An LCD That's Easy to See - Indoors or Out Power LCD Plus

You can set the LCD to any of five brightness levels for optimal viewing in a variety of lighting conditions. When shooting outdoors on a sunny day, make the LCD brighter. When shooting indoors, lower it. This not only makes the LCD easier to see, it's also easier on your eyes.



Exceptional Leica-certified image quality LEICA DICOMAR Lens

SDR-H250



Leica AG of Germany is the manufacturer of fine cameras and lenses favoured by photographers everywhere. Drawing on Leica's renowned optical technology, this advanced lens captures clear, crisp, finely nuanced images with outstanding detail and contrast. Thanks to a multi-coating applied during the manufacturing process, the lens also minimises flare and ghosts.

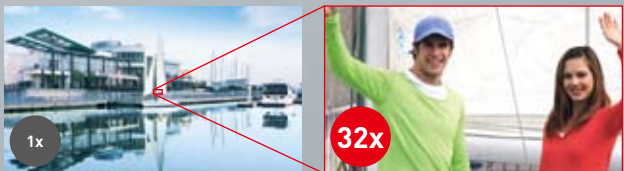
*Leica is a registered trademark of Leica Microsystems IR GmbH, and Dicomar is a registered trademark of Leica Camera AG.



Bringing distant subjects up close while maintaining image quality 32x Optical Zoom

SDR-H20

This 32x zoom can fill the screen with even a distant subject. This lens is not only the powerful zoom offered in a home-use digital video camera, it also features low distortion. And because it's optical, there is no quality loss — you get the images in all their natural beauty.



36mm [35mm film camera equivalent] [16:9] 1152mm [35mm film camera equivalent] [16:9]



Easy Shooting and Viewing

When It Comes to Shooting Videos, Simpler Is Better

Flip a single switch to start recording. When you're done shooting, you can view your pictures right away on a DVD player. Whether you're recording a special event or just taking a few casual shots, an easy-to-use video camera is more fun. The DVD e.cam is perfect for people who like to take it easy when they're taking videos.



VDR-D310



2.7" WIDE LCD



Crystal Engine

10x Optical Zoom

VDR-D220



2.7" WIDE LCD



32x Optical Zoom

Pure Colour Engine

VDR-D160



2.5" LCD



30x Optical Zoom

Pure Colour Engine

Multi-Format Recording (DVD-RAM, DVD-RW, DVD-R DL, DVD-R)

You can choose whichever type of disc works best with your DVD player or recorder.

Up to 138 min of recording (DVD-R Dual Layer) (Approx.)

Recording mode	Recordable time
XP Mode	35 min
SP Mode	69 min
LP Mode	138 min

Easy Shooting, Easy Viewing

1 Quick, easy operation.

The DVD e.cam automatically finds a blank section on the disc for recording. The index screen makes it easy to search for a particular scene. You can view, delete and edit quickly and easily.



2 Easy, direct networking.

When you finish shooting, just take the disc from your DVD e.cam and slip it right into your DVD player or recorder. There's no need to connect any cables and you can start viewing right away.



Shooting Fun. Viewing Fun. Enjoy Video Your Own Way.

If you want to enjoy shooting videos, enjoy viewing them and enjoy creating your own video collection, you'll love the e.cam.

This convenient video camera also lets you add previous recordings to your video collection.



NV-GS230



2.5" LCD



Crystal Engine

NV-GS60



2.5" LCD



Pure Colour Engine

30x Optical
Zoom

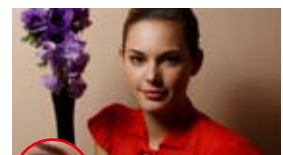
High-performance image processing **Crystal Engine** & **Pure Colour Engine**



Crystal Engine

The Crystal Engine is a special image processing circuit for 3CCD camera systems. It processes the R, G and B signals from the three CCDs individually, so it gives both moving and still pictures exceptional quality. And the Pure Colour Engine converts the CCD output signal from a complementary colour signal into an RGB signal at an early stage and extracts the low-frequency luminance component from the RGB signal. This innovative engine also achieves truly superb colour reproduction for high-zoomed pictures.

Crystal Engine		Pure Colour Engine	
H250	D310	H20	D220
GS230		D160	GS60

Without Crystal Engine:
picture noiseWith Crystal Engine:
smooth from corner to

Advanced Imaging Technologies for Capturing Beautiful Videos

Exceptional Leica-certified image quality **LEICA DICOMAR Lens**

SD1	DX1	H250
D310		

**LEICA
DICOMAR**

Leica AG of Germany is the manufacturer of fine cameras and lenses favoured by photographers everywhere. Drawing on Leica's renowned optical technology, this advanced lens captures clear, crisp, finely nuanced images with outstanding detail and contrast. Thanks to a multi-coating applied during the manufacturing process, the lens also minimises flare and ghosts.



*Leica is a registered trademark of Leica Microsystems IR GmbH, and Dicomar is a registered trademark of Leica Camera AG.



Washed-out image due to strong light



Multi-coated lens: clear image with no colour bleeding

Capture even complex motion with precision **MPEG2 Engine**

H250	H20
D310	D220 D160

Panasonic's MPEG2 engine is a wide-range, high-precision engine that produces smooth, beautiful moving pictures. Because it precisely records the differences in each frame, it can render fast, complex motions with exceptional precision. The MPEG2 engine also uses the Variable Bit Rate system that Panasonic adopted for the high-end DIGA DVD recorder. Giving LP (long play mode) recordings nearly twice the resolution captured with previous Panasonic MPEG2 recording video cameras, this lets the SD e.cam and DVD e.cam record clear, smoothly flowing pictures.



Conventional model



Model with MPEG2 engine

So Easy to Use, Even Beginners Get Beautiful Results

One-Touch Navigation for easy, intuitive setting and shooting without taking your eyes off the subject

ALL

With One-Touch Navigation, just press the centre of the joystick to display an operating menu. The operations you use most often are right on the monitor, so it's easy to change settings or operate the camera without looking away from your subject.

Operation Icon Examples

	Backlight Compensation
	Help Mode
	Tele Macro Mode
	FadeIN/FadeOUT
	Soft Skin Mode
	Colour Night View

Help Mode



In Help Mode there's an on-screen explanation of the icons.



Mode Dial

Just turn the dial and you're ready to shoot or to view the images afterward. Just rotate the dial with your fingertip to select the icon that corresponds to the mode you want.

*Icon display varies depending on the model.

The Joy of Creating Videos that Perfectly Capture a Scene

Tele-Macro for sharp focusing, from a short distance

SD1 DX1 H250
D310 GS230

Using the zoom at full magnification, you can shoot macro close-ups while maintaining a short distance from your subject. This makes it much easier to capture extreme close-ups without your body or camera casting a shadow on the subject and while keeping the background in soft focus.



With no macro mode, focusing is difficult



Crisp, sharp shots from a short distance

Give your subjects smoother looking skin Soft Skin Mode

ALL

When this function detects skin tones, it softens the focus in that area. This has a skin beautifying effect, which makes wrinkles and lines appear less noticeable. When turned on, this function makes blemishes and moles look less conspicuous, while preserving resolution in areas of the picture outside of the skin.



Capture crisp, vivid images, even in low lighting Colour Night View

ALL

Leave the light off. Colour Night View gives you images with colour even in dim lighting. Light is gentle and easy on the eyes, so you can snap shots of sleeping children without waking them up.



Colour Night View OFF



Colour Night View ON

More Convenient Shooting Functions

Easy On/Off saves battery life

ALL

When you open the LCD, the power switches on. Shut it and the power goes off. Pull out the viewfinder and the power switches on. Store it and the power goes off. Easy On/Off reduces the time required for operating the camera.



And...

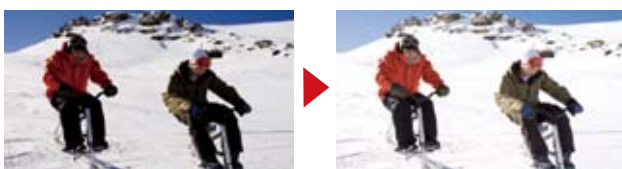
The lens cover opens or closes when the power is turned on or off. No more worries about losing a lens cap.



Easy to see, even outdoors - Power LCD

SD1 DX1 GS230

Simply press the Power LCD button and the LCD becomes brighter, making it easier to see outdoors or in other bright locations. Also, a new scanning technology allows the LCD to show diagonal lines more sharply.



OFF (Daylight Condition)

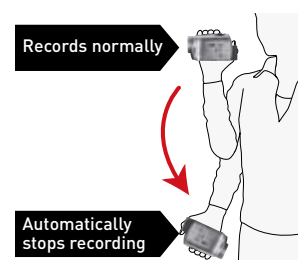
ON (180% [approx.] Brightness)

Helps prevent wasted shots AGS (Anti-Ground Shooting mode)

H250 D310

The O.I.S. linear motor system can detect when the camera is in an unusual shooting position – when you've inadvertently left it on in recording mode. In these cases, the camera automatically stops recording, saving both battery power and disc space.

*This mode can be selected from the menu.





Easy Networking – For More Fun When the Shooting's Done

Transfer data to a PC
at high speed too
USB 2.0 (High-Speed Mode)

SD1	H250	H20
D310	GS230	

USB 2.0 compatibility lets you upload DV data to a PC at high-speed over a single USB cable.

Comes with Software that Makes It Easy to Transfer and Edit Images*

The included editing software is just the tool you need to make polished, smartly finished productions. It lets you load images into your PC for easy editing, add special effects, and dub in a soundtrack - all from a single, easy-to-understand screen.

*See page 16 for further information



Real-time visual communication
WEB Camera Function

GS230
GS60

With the camera connected via USB cable to a PC, start up Windows® Messenger and the camera instantly turns into a web camera. Ideal for teleconferencing over the Internet, or for surveillance camera use.



Quick, comfortable editing, even with
large-capacity discs
High-Speed Data Transfer to a DVD Recorder

D310
D220
D160

With DVD's high-speed data transfer, you can dub your recordings quickly and easily onto a DVD video recorder's hard disk drive. Enjoy sophisticated editing with the DVD recorder, or save your recordings onto DVD and create a collection of your own DVDs.



Use an
SDHC/SD Memory Card
to transfer image easily



SD1	DX1
H250	H20
D220	D160
	GS230

SDHC/SD Memory Cards are the ideal recording and storage media for today's visual communication and networking. They make it easy to instantaneously transfer image data to a PC or printer. *Usable capacity will be less.



FEATURE COMPARISON

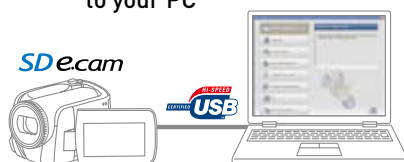
	HD Video Camera		SD ^{HD} ecam Hard Disk/SD Card Video Camera		DVD ^{HD} ecam			ecam	
	HDC-SD1	HDC-DX1	SDR-H250	SDR-H20	VDR-D310	VDR-D220	VDR-D160	NV-GS230	NV-GS60
High-Quality Pictures									
Media	SDHC/SD Memory Card	8cm DVD Disc	SDHC/SD Memory Card Hard Disk Drive	SDHC/SD Memory Card Hard Disk Drive	8cm DVD Disc	8cm DVD Disc	8cm DVD Disc	mini DV Tape	mini DV Tape
Recording Format	AVCHD	AVCHD	MPEG2	MPEG2	MPEG2	MPEG2	MPEG2	DV	DV
3CCD Camera System	Yes	Yes	Yes	No	Yes	No	No	Yes	No
O.I.S.(Optical Image Stabiliser)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Leica Dicomar Lens	Yes	Yes	Yes	No	Yes	No	No	No	No
Image Processing LSI	HD Crystal Engine	HD Crystal Engine	Crystal Engine	Pure Colour Engine	Crystal Engine	Pure Colour Engine	Pure Colour Engine	Crystal Engine	Pure Colour Engine
MPEG2 Engine	No	No	Yes	Yes	Yes	Yes	Yes	No	No
Optical Zoom	12x	12x	10x	32x	10x	32x	30x	10x	30x
Still Picture Recording	2.1 MEGA	2.1 MEGA	3.1 MEGA	VGA	3.1 MEGA	VGA	VGA	2.3 MEGA	No
Simultaneous Motion Video & Still Picture Recording	2.1 MEGA	2.1 MEGA	No	No	No	No	No	VGA	No
High-Picture-Quality Wide Mode(16:9)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Ease and Versatility									
LCD	3.0" Wide	3.0" Wide	2.7" Wide	2.7" Wide	2.7" Wide	2.7" Wide	2.5"	2.5"	2.5"
Power LCD	Yes	Yes	Yes [Plus]	Yes [Plus]	No	No	No	Yes	No
One-Touch Navigation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Help Mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Direct Mode Dial	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Built-in Flash	Yes	Yes	No	No	No	No	No	No	No
Colour Night View	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Built-in LED Light	No	No	Yes	No	No	No	No	No	No
Soft Skin Mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tele Macro	Yes	Yes	Yes	No	Yes	No	No	Yes	No
AGS	No	No	Yes	No	Yes	No	No	No	No
Quick Start	1.7 sec	No	No	No	No	No	No	1.7 sec	1.7 sec
Easy On/Off	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lens Cover	Auto	Auto	Manual	Cap	Cap	Cap	Cap	Cap	Cap
Accessory Shoe	No	Cold	No	No	Cold	Cold	No	Cold	No
Networking									
USB2.0	High-Speed Mode	High-Speed Mode	High-Speed Mode	High-Speed Mode	High-Speed Mode	High-Speed Mode	High-Speed Mode	High-Speed Mode	Full Speed Mode
SDHC/SD Memory Card Compatible	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
PictBridge Compatible	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
DV IN/OUT	No	No	No	No	No	No	No	Yes	Yes
Analogue IN/OUT	Out	Out	Out	Out	Out	Out	Out	Out	Out
WEB Camera Function	No	No	No	No	No	No	No	Yes	Yes

With Panasonic's Included Editing Software, Anyone Can Enjoy Easy, Versatile Video Editing!

ImageMixer3 for SD e.cam [Hard Disk/SD Card Video Camera] (H250/H20)

1 Transfer Data

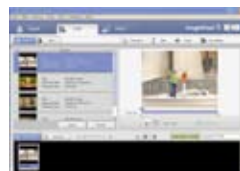
Transfer the moving pictures to your PC



Just slip the SDHC/SD Memory Card right into your PC. Or use the USB cable (included) to connect your SD e.cam to your PC and transfer the moving picture data that way.

2 Edit

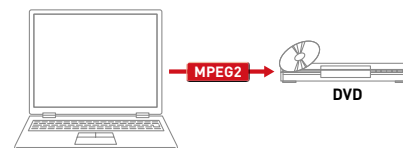
Quick and easy



Use ImageMixer3 to put scenes in a different order and delete the ones you don't want. It's easy.

3 Save the Results

Resave it onto a DVD disc

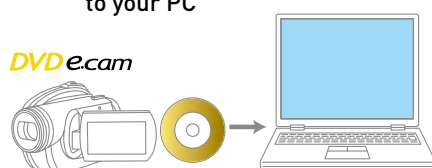


When you're finished with your video production, you can resave the edited version onto a DVD disc.

DVD-MovieAlbumSE 4.3 & DVDfunSTUDIO 2.5 for DVD e.cam (D310)

1 Transfer Data

Transfer the moving pictures to your PC



Just slip the disc right into your PC. Or use the USB cable (included) to connect your DVD e.cam to your PC and transfer the moving picture data that way.

2 Edit

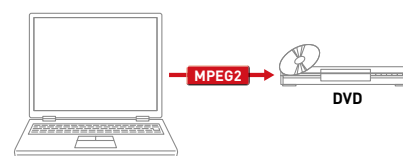
Quick and easy



Use DVD-MovieAlbumSE 4.3 to put scenes in a different order and delete the ones you don't want. It's easy.

3 Save the Results

Resave it onto a DVD disc



When you're finished with your video production, you can use DVDfunSTUDIO 2.5 (included) to resave the edited version onto a DVD disc.

SweetMovieLife 1.0E & MotionDV STUDIO 5.6E LE for DV for e.cam (GS230)

1 Transfer Data

Transfer the moving pictures to your PC



A USB cable lets you connect your camera to your PC, making it easy to transfer the moving pictures.

2 Edit

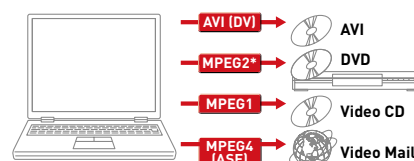
Quick and easy



[For Beginners] SweetMovieLife 1.0E: Step-by-step instructions are shown right on the monitor.
[For Advanced Users] MotionDV STUDIO 5.6E LE for DV: This includes a wide variety of titles, video effects and transition effects.

3 Save the Results

Choose how you want to save it



You can save the results in AVI format, convert it to the MPEG1 format or convert it to MPEG4 format. Also you can burn your production onto a DVD disc*. *Requires DVD writing software.

SYSTEM REQUIREMENTS

SD1

	HD Writer Ver 1.0E for SD1	Card Reader Function (Mass Storage)
Interface	USB port (Hi-Speed USB (USB 2.0) recommended)	USB port
Windows® 2000	○ [SP4]	○ [SP4]
Windows® XP	○ [SP2]	○ [SP1/SP2]
CPU	Intel® Pentium® III 1.0GHz or higher	Intel® Pentium® III 450MHz or higher

- About HD Writer Ver 1.0E
- This software is not compatible with a multi-boot environment.
- This software is not compatible with a multi-CPU environment.
- Operation is not guaranteed on Microsoft® Windows® XP Media Center Edition, Tablet PC Edition and not compatible with 64-bit operation systems.
- Supplied CD-ROM is available for Windows only.
- This software is not compatible with Microsoft Windows 3.1, Windows 95, Windows 98, Windows Me and Windows NT.
- Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Other names of systems and products mentioned in this brochure are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

H250/H20

	Built-in SD Drive	Built-in HDD Drive	ImageMixer3
Interface	USB port (Hi-Speed USB (USB 2.0) recommended)	USB port (Hi-Speed USB (USB 2.0) recommended)	USB port (Hi-Speed USB (USB 2.0))
Windows® 2000	○*	○*	○ [SP3/SP4]
Windows® XP	○*	○*	○
CPU	Intel® Pentium® II 300MHz or higher	Intel® Pentium® II 300MHz or higher	Intel® Pentium® III 800MHz or higher
Mac OS® X v10.3~10.4	○*	○*	○
CPU	PowerPC G3 (400MHz or higher), G4, G5, Intel® Core Duo, Intel® Core Solo	PowerPC G3 (400MHz or higher), G4, G5, Intel® Core Duo, Intel® Core Solo	PowerPC G3 (400MHz or higher), G4, G5, Intel® Core Duo or higher

*USB equipment operates with the driver installed as standard in OS

D310

	DVD-RAM Driver	DVD-MovieAlbumSE 4.3	DVDfunSTUDIO 2.5
Interface	USB 2.0 (High Speed recommended)	USB 2.0 (High Speed recommended)	USB 2.0 (High Speed recommended)
Windows® 2000	○	○	○
Windows® XP	○	○	○
CPU	Intel® Pentium® III 450MHz or higher	Intel® Pentium® III 450MHz or higher	Intel® Pentium® III 450MHz or higher

- The supplied software can not be used on Macintosh®.
- DirectX will be installed automatically during installation of the supplied software.
- Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Other names of systems and products mentioned in this brochure are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.
- Operation is not guaranteed on Microsoft® Windows® XP Media Center Edition, Tablet PC Edition and not compatible 64-bit computers.

GS230

	MotionDV STUDIO 5.6E LE for DV/SweetMovieLife 1.0E	Web Camera Function	Card Reader Function (Mass Storage)	iMovie® 4/iMovie® HD
Interface	USB 2.0 (High Speed recommended)/DV (IEEE1394)	USB 1.1 or later	USB 1.1 or later	DV (FireWire®)
Windows® 2000	○ [SP4]*1	○ [SP4]	○	
Windows® XP	○ [SP2]*1	○ [SP1/SP2]	○	
CPU	Intel® Pentium® III 800MHz or higher	Intel® Pentium® III 450MHz or higher	Intel® Pentium® II 300MHz or higher	
Mac OS® X v10.3~10.4	—	—	○	○*2
CPU				PowerPC G3 (400MHz or higher), G4, G5 Intel® Core Duo, Intel® Core Solo

- About MotionDV STUDIO LE / SweetMovieLife In USB connection: Capturing images to a PC is available.
- In DV connection: Capturing images to a PC & Recording to a digital video camera are available. available.
- *1 With NV-GS230EG/EF/E/EP/EB, Recording images from a PC to a digital video camera is not available. With NV-GS230EG/EF/E/EP/EB, Recording images from a PC to a digital video camera is not available.
- About iMovie 4 / iMovie HD
- In DV (FireWire) connection: Capturing images to a PC & Recording to a digital video camera are available.
- *2 With NV-GS230EG/EF/E/EP/EB, Recording images from a PC to a digital video camera is not available. With NV-GS230EG/EF/E/EP/EB, Recording images from a PC to a digital video camera is not available.
- DV (IEEE1394, FireWire) cable is sold separately.
- About Web Camera Function
- When this function is used, Windows Messenger 5.0 or 5.1 or MSN Messenger 7.0 or 7.5 or Windows Live Messenger 8.0 is necessary. (not included)
- Microsoft Windows 3.1, Windows 95, Windows 98, Windows Me and Windows NT are not compatible.
- Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and / or other countries.
- Apple, Mac OS, iMovie / iMovie HD, FireWire are either registered trademarks or trademarks of Apple Computer, Inc. in the United States and/or other countries.
- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

GS60

	Web Camera Function	iMovie® 4/iMovie® HD
Interface	USB 1.1 or later	DV [FireWire®]
Windows® XP	○ [SP2]	
CPU	Intel® Pentium® III 450MHz or higher	
Mac OS® X v10.3~10.4	—	
CPU		○*
		PowerPC G3 [400MHz or higher], G4, G5

- About iMovie 4 / iMovie HD
- In DV (FireWire) connection: Capturing images to a PC & Recording to a digital video camera are available.* With NV-GS60EG/EF/E/EP/EB, Recording images from a PC to a digital video camera is not available.
- * With NV-GS60EG/EF/E/EP/EB, Recording images from a PC to a digital video camera is not available. •DV (IEEE1394, FireWire) cable is sold separately. •USB cable is sold separately. (GS60)
- About Web Camera Function
- When this function is used, Windows Messenger 5.0 or 5.1 or MSN Messenger 7.0 or 7.5 or Windows Live Messenger 8.0 is necessary. (not included)
- Microsoft Windows 3.1, Windows 95, Windows 98, Windows Me and Windows NT are not compatible. •Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Apple, Mac OS, iMovie / iMovie HD, FireWire are either registered trademarks or trademarks of Apple Computer, Inc. in the United States and/or other countries.
- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

•Please confirm compatibility with Microsoft® Windows Vista on the following website. http://panasonic.jp/support/global/cs/e_cam/

OPTIONAL ACCESSORIES

Rechargeable Lithium-Ion Battery Pack *1  VW-VBG130-K VW-VBG260-K VW-VBJ10 CGR-DU06 CGA-DU07 CGA-DU12 CGA-DU14 CGA-DU21		AC Adaptor  VW-AD20 VW-AD21 VW-AD11	Stereo Microphone  VW-VMS2	Shoe Adaptor Foldable design & compact size  VW-SK12
Video DC Light Video shooting in the dark  VW-LDC102 VW-LDC10	Tele Conversion Lens  VW-LT3014 VW-LT3714M	Wide Conversion Lens  VW-LW3007 VW-LW3707M3	Filter Kit For shooting under strong light and lens protection VW-LF37W VW-LF43N 	
SDHC/SD Memory Card *2  4GB*: RP-SDV04G RP-SDM04G 2GB*: RP-SDV02G RP-SDM02G 1GB*: RP-SDV01G RP-SDR01G 512MB*: RP-SDK512 RP-SDR512 *1GB = 1 billion bytes. 1MB = 1 million bytes. Usable capacity will be less.		HDMI Cable  RP-CDHG15 (1.5m) RP-CDHG30 (3.0m) RP-CDHG50 (5.0m)	DV Cable  VW-CD1	

Mini DV Tape  AY-DVM80YE AY-DVM80FF AY-DVM60YE AY-DVM60FF	Cleaning Tape  AY-DVMCLC	DVD <div> <div> DVD-RAM  LM-AF30E LM-AF60E </div> <div> DVD-RW  LM-RW30E LM-RW60E </div> <div> DVD-R  LM-RF30E LM-RF60E </div> <div> DVD-RDL  LM-RF55LE </div> </div>			
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Accessories	Model No.	HD Video Camera		SD Card/Hard Disk Video Camera		DVD e.cam			e.cam	
		SD1	DX1	H250	H20	D310	D220	D160	GS230	GS60
AC Adaptor	VW-AD20		●							
	VW-AD21	●								
	VW-AD11									
				●	●	●	●	●	●	●
Rechargeable Lithium Ion Battery Pack	VW-VBG130-K (1320 mAh)	●		●*3	●*3	●*3	●*3	●*3	●*3	●*3
	VW-VBG260-K (2640 mAh)		●	●*3	●*3	●*3	●*3	●*3	●*3	●*3
	VW-VBJ10 (1000 mAh)									
	CGR-DU06 (640 mAh)				●		●		●	●
	CGR-DU07 (680 mAh)									
	CGA-DU12 (1150 mAh)			●	●	●	●	●	●	●
	CGA-DU14 (1360 mAh)			●	●	●	●	●	●	●
Video DC Light	VW-LDC102	●	●*4							
	VW-LDC10					●	●		●	●
Stereo Microphone	VW-VNS2	●			●	●	●	●	●	●
Shoe Adaptor	VW-SK12	●		●	●	●	●	●	●	●
Tele Conversion Lens	VW-LT3014							●		●
	VW-LT3714M					●	●		●	
Wide Conversion Lens	VW-LW3007							●		●
	VW-LW3707M3					●	●		●	
Filter Kit	VW-LF43N	●	●							
	VW-LF37W					●	●		●	
SD Media Storage	VW-PT2	●	●	●	●	●	●	●	●	●
HDMI Cable	RP-CDHG15	●	●							
	RP-CDHG30	●	●							
	RP-CDHG50	●	●							
	RP-CDHG70	●	●							
DV Cable	VW-CD1								●	●
DVD-RAM Disc	LM-AF30		●			●	●	●		
	LM-AF60		●			●	●	●		
DVD- RW Disc	LM-RW30		●			●	●	●		
	LM-RW60		●			●	●	●		
DVD-R Disc	LM-RF30		●			●	●	●		
	LM-RF60		●			●	●	●		
DVD-R DL	LM-RF55L		●			●	●			
SDHC/SD Memory Card	4GB RP-SDV04G/4GB PR-SDM04G/2GB RP-SDV02G/2GB PR-SDM02G/1GB RP-SDV01G/1GB PR-SDR01G/512MB PR-SDK512/512MB PR-SDR512	●	●	●	●	●	●	●	●	●
mini DV Tape	AY-DVM80YE								●	●
	AY-DVM60YE								●	●
	AY-DVM80								●	●
	AY-DVM60								●	●
Cleaning Tape	AY-DVMCLC								●	●

Not all accessories are available in all countries.

- *1 •VW-VBG130-K and VW-VBG260-K come with a function to check whether the battery and unit can be safely used together.
•Batteries made by other companies which have been certified by Panasonic may be used with these units, but we offer no guarantee as to the quality, performance or safety of such batteries.
•Exercise care when purchasing batteries. Many fake or imitation batteries have been found among those sold at unusually low prices and those which customers cannot check for themselves before purchasing.
•Please confirm the latest information about battery on the following website. <http://panasonic.co.jp/pavc/global/cs/info/battery.html> (This website is in English only.)
- *2 •An SDHC/SD Memory Card utilizes a portion of the storage space for formatting and other purposes.
•Usable capacity will be less.
- *3 •Without "remaining battery life display" function
- *4 •Shoe adaptor required (VW-SK12)

■ Moving Picture Recording Times (approx.)

SD1

Image Quality	Capacity	SDHC Memory Card	SD Memory Card			
		4GB*1	2GB*1	1GB*1	512MB*1	256MB*1
HF (13Mbps)		40 min.	20 min.	10 min.	5 min.	2 min.
HN (9Mbps)		60 min.	30 min.	15 min.	7 min.	3 min.
HE (6Mbps)		90 min.	45 min.	22 min.	10 min.	5 min.

DX1

Mode	HF (13Mbps)	HN (9Mbps)	HE (6Mbps)
DVD-RAM (dual-sided)	28 min.	42 min.	62 min.
DVD-RW (dual-sided)	28 min.	42 min.	62 min.
DVD-R DL (dual-layer)	26 min.	40 min.	60 min.
DVD-R (single-sided)	14 min.	21 min.	31 min.

H250/H20

Image Quality	Capacity	HDD	SDHC Memory Card	SD Memory Card		
		30GB*1	4GB*1	2GB*1	1GB*1	512MB*1
XP (Super Fine)		7 h	50 min.	25 min.	12 min.	6 min.
SP (Fine)		13 h 30 min.	1 h 40 min.	50 min.	25 min.	12 min.
LP (Normal)		27 h	3 h 20 min.	1 h 40 min.	50 min.	25 min.



D310/D220/D160

Mode	XP (Super Fine)	SP (Fine)	LP (Normal)
DVD-RAM (dual-sided)	36 min.	74 min.	150 min.
DVD-RW (dual-sided)	36 min.	74 min.	150 min.
DVD-R DL (dual-layer)	35 min.	69 min.	138 min.
DVD-R (single-sided)	18 min.	37 min.	75 min.



• These figures vary depending on the pictures being recorded.

■ Number of Recordable Still Pictures (approx.)









SD1

Image Quality	Capacity	SDHC Memory Card	SD Memory Card			
		4GB*2	2GB*2	1GB*2	512MB*2	256MB*2
1920 x 1080 pixels [16:9] [2.1 MB]		3290	1670	820	410	200
		5160	2630	1290	640	320









DX1

Image Quality	Capacity	SDHC Memory Card	SD Memory Card			
		4GB*1	2GB*1	1GB*1	512MB*1	256MB*1
1920 x 1080 pixels [16:9] [2.1 MB]		3290	1680	820	410	210
		5170	2630	1290	650	330





H250

Image Quality	Capacity	HDD	SDHC Memory Card	SD Memory Card		
		30GB*1	4GB*1	2GB*1	1GB*1	512MB*1
2048 x 1512 pixels [3.1 MB]		19160	2520	1280	630	310
		29950	3950	2010	990	490
1920 x 1080 pixels [16:9] [2.1 MB]		24960	3290	1670	820	410
		39230	5170	2630	1290	640
1280 x 960 pixels [1.2 MB]		47070	6200	3160	1550	770
		74890	9870	5030	2470	1230
640 x 480 pixels [0.3 MB]		205940	27150	13820	6790	3390
		411880	54290	27640	13580	6780





D310

Image Quality	Capacity	SDHC Memory Card	SD Memory Card			
		4GB*1	2GB*1	1GB*1	512MB*1	256MB*1
2048 x 1512 pixels [3.1 MB]		2520	1290	630	320	160
		3950	2010	990	490	250
1920 x 1080 pixels [16:9] [2.1 MB]		3290	1680	820	410	210
		5170	2630	1290	650	330
1280 x 960 pixels [1.2 MB]		6210	3160	1550	780	390
		9870	5030	2470	1230	620
640 x 480 pixels [0.3 MB]		27150	13830	6800	3400	1710
		54310	27660	13600	6790	3430







H20

Image Quality	Capacity	HDD	SDHC Memory Card	SD Memory Card		
		30GB*1	4GB*1	2GB*1	1GB*1	512MB*1
640 x 480 pixels [0.3 MB]		205940	27150	13820	6790	3390
		411880	54290	27640	13580	6780
640 x 360 pixels [16:9] [0.2 MB]		205940	27150	13820	6790	3390
		411880	54290	27640	13580	6780



D220

Image Quality	Capacity	SDHC Memory Card	SD Memory Card			
		4GB*1	2GB*1	1GB*1	512MB*1	256MB*1
640 x 480 pixels [0.3 MB]		27150	13830	6800	3400	1710
		54310	27660	13600	6790	3430
640 x 360 pixels [16:9] [0.2 MB]		27150	13830	6800	3400	1710
		54310	27660	13600	6790	3430

GS230

Image Quality	Capacity	SD Memory Card			
		2GB*1	1GB*1	512MB*1	256MB*1
1760 x 1320 pixels [16:9] [2.3 MB]		1680	831	414	208
		2700	1334	666	335
1280 x 960 pixels [1.0 MB]		3160	1550	774	390
		5030	2495	1246	628
640 x 480 pixels [0.3 MB]		14080	7040	3520	1760
		28160	14080	7040	3520

D160

Image Quality	Capacity	SDHC Memory Card	SD Memory Card			
		4GB*1	2GB*1	1GB*1	512MB*1	256MB*1
640 x 480 pixels [0.3 MB]		27150	13830	6800	3400	1710
		54310	27660	13600	6790	3430



-  High Picture Quality  Normal Picture Quality
- These figures vary depending on the subject being photographed.

*1 Usable capacity will be less.

*2 We recommend using the DVD discs made by Panasonic for moving picture recording. We recommend using SD Memory Cards and SDHC Memory cards conforming to class2 or higher of the SD Speed Class Rating or SD Memory Cards made by Panasonic for motion picture recording. Please confirm the latest information about DVD discs and SDHC/SD Memory Cards that can be used for moving picture recording, on the following website. http://panasonic.co.jp/pavc/global/cs/e_cam [This website is in English only.]

SPECIFICATIONS

	HD Video Camera	DVD e.cam	
	HDC-SD1/HDC-DX1	VDR-D310	VDR-D220/VDR-D160
GENERAL			
Power Supply	SD1: DC9.3 V/7.2 V DX1: DC7.3 V/7.2 V	DC7.9 V/ 7.2 V	DC7.9 V/ 7.2 V
Power Consumption	SD1: 8.0 W DX1: 11.4 W	4.1 W (EVF)/4.4 W (LCD)	D220: 3.1 W (EVF)/3.4 W (LCD) D160: 3.5 W (EVF)/3.9 W (LCD)
Weight (w/o Battery)	SD1: 430 g DX1: 680 g	510 g	D220: 510 g D160: 480 g
Dimensions (W x H x D)	SD1: 74.1 x 67 x 137 mm DX1: 91.5 x 90.2 x 162.4 mm	66.7 x 91.1 x 142.7 mm	D220: 66.7 x 91.1 x 142.7 mm D160: 52.5 x 87 x 129 mm
Media	SD1: SDHC/SD Memory Card DX1: 8cm DVD Disc	8 cm DVD Disc, SDHC/SD Memory Card	D220: 8 cm DVD Disc, SDHC/SD Memory Card D160: 8 cm DVD Disc
LENS SECTION			
Image Sensor	1/4"CCD x 3 [560 k x 3pixel Total/ 520 k x 3 [16:9] (Moving Picture/Still Picture) Effective]	1/6" CCD x 3 [800 k x 3 pixels, Total/630 k x 3 [4:3], 540 K x 3 [16:9] (Moving Picture)/ 710 k x 3 [4:3], 540 k x 3 [16:9] (Still Picture) Effective]	D220: 1/6"CCD [800 k pixels, Total/400 k [4:3], 540 k [16:9] (Moving Picture)/410 k [4:3], 550 k [16:9] (Still Picture) Effective] D160: 1/6"CCD (400 k pixels, Total/400 k [4:3], (Moving Picture) /410 k [4:3] (Still Picture) Effective]
F Value	F1.8 [WIDE]/F2.8 [TELE]	F1.8 [WIDE]/F2.8 [TELE]	D220: F1.8 [WIDE]/F3.7 [TELE] D160: F1.8 [WIDE]/F3.9 [TELE]
Optical Zoom	12x Variable Speed Zoom	10 x Variable Speed Zoom	D220: 32 x Variable Speed Zoom D220: 30 x Variable Speed Zoom
Focal Length	4.0—48.0 mm	3.0—30.0 mm	D220: 2.3—73.6 mm D160: 1.9—57.0 mm
Filter Diameter	43 mm	37 mm	D220: 37 mm D160: 30.5 mm
35mm Film Camera Equivalent	38.5—462 mm [16:9] (Moving Picture/Still Picture)	46.1—461 mm [4:3], 47.1—471 mm [16:9] (Moving Picture) 43.4—434 mm [4:3], 47.0—470 mm [16:9] (Still Picture)	D220: 44.0—1408 mm [4:3], 36.0—1152 mm [16:9] (Moving Picture) 43.3—1386 mm [4:3], 35.3—1130 mm [16:9] (Still Picture) D160: 35.7—1072 mm
Lens Brand	Leica Dicomar	Leica Dicomar	Panasonic
CAMERA SECTION			
Minimum Illumination	2 Lux (Colour Night View)	1 Lux (Colour Night View)	2 Lux (Colour Night View)
Focus	AF/Manual	AF/Manual	AF/Manual
White Balance	Auto/Indoor/Outdoor/White Set	Auto (with IR Sensor)/Indoor/Outdoor/White Set	Auto (with IR Sensor)/Indoor/Outdoor/White Set
Shutter Speed	1/50—1/8000 sec. (Moving Picture), 1/50—1/8000 sec. (Still Picture)	1/50—1/8000 sec. (Moving Picture), 1/25—1/2000 sec. (Still Picture)	1/50—1/8000 sec. (Moving Picture), 1/50—1/500 sec. (Still Picture)
Iris	Auto/Manual	Auto/Manual	Auto/Manual
Backlight Compensation	Yes	Yes	Yes
EVF	SD1: — DX1: 0.44" Wide [183 k pixels]	0.33" Colour [113 k pixels]	D220: 0.33" Colour [113 k pixels] D160: 0.3" Colour [123 k pixels]
Monitor	3.0" Wide LCD (250 k pixels)	2.7" Wide LCD (123 k pixels)	D220: 2.7" Wide LCD (123 k pixels) D160: 2.5" LCD (105 k pixels)
Microphone	Stereo SECM, 5.1-ch Surround Sound, Zoom Mic, Wind Noise Reduction	Stereo Zoom Mic, Wind Noise Reduction	Stereo Zoom Mic, Wind Noise Reduction
Date Recording	Auto Date (in Data Code)	Auto Date (in Data Code)	Auto Date (in Data Code)
OSD Language	English/German/French/Italian/Dutch/Swedish/Spanish/Polish/ Czech /Turkish	English/German/French/Italian/Dutch/Swedish/Spanish/Polish/ Czech /Turkish	English/German/French/Italian/Dutch/Swedish/Spanish/Polish/ Czech /Turkish
Image Stabilizer	O.I.S.	O.I.S.	D220: O.I.S. D160: E.I.S. (Electronic Image Stabilizer)
Digital Zoom	30 x—700 x	25 x—700 x	D220: 32 x—1000 x D160: 30 x—1000 x
Flash	1 m—2.5 m (approx.)	—	—
DISC SECTION			
Applicable Disc	SD1: — DX1: 8 cm DVD-RAM Ver. 2.1/8 cm DVD-R for General Ver. 2.0/ 8 cm DVD-RW Ver.1.1 2 x-speed [2 x/1 x]/DVD-R for DL Ver. 3.0	8 cm DVD-RAM Ver. 2.1/8 cm DVD-R for General Ver. 2.0/ 8 cm DVD-RW Ver. 1.1 2 x-speed [2 x/1 x]/ DVD-R for DL Ver. 3.0	8 cm DVD-RAM Ver. 2.1/8 cm DVD-R for General Ver. 2.0/ 8 cm DVD-RW Ver. 1.1 2 x-speed [2 x/1 x]/ DVD-R for DL Ver. 3.0
Cue/Review	SD1: — DX1: Forward/Reverse	Forward/Reverse	Forward/Reverse
Skip	SD1: — DX1: Forward/Reverse	Forward/Reverse	Forward/Reverse
CARD SECTION			
Card Slot	SDHC/SD	SDHC/SD	SDHC/SD
Still Picture	JPEG Picture size 1920 x 1080 [16:9] 2.1 MEGA	JPEG Picture size 2048 x 1512 [4:3] 3.1 MEGA or 1920 x 1080 [16:9] 2.0 MEGA or 1280 x 960 [4:3] 1.0 MEGA or 640 x 480 [4:3] 0.3 MEGA	D220: JPEG Picture size: 640 x 480 [4:3] 0.3 MEGA or 640 x 360 [16:9] 0.2 MEGA D160: JPEG Picture size: 640 x 480 [4:3] 0.3 MEGA
DPOF	Max 999 stills	Max 999 stills	Max 999 stills
PictBridge	Yes	Yes	Yes
RECORDING SECTION			
Format	AVCHD (Moving Picture)	MPEG2 (Moving Picture)	MPEG2 (Moving Picture)
Recording Mode	HF [13Mbps/CBR], HN [9Mbps/VBR], HE [6Mbps/VBR]	XP [10 Mbps/VBR], SP [5 Mbps/VBR], LP [2.5 Mbps/VBR]	XP [10 Mbps/VBR], SP [5 Mbps/VBR], LP [2.5 Mbps/VBR]
Playback Mode	HF [13Mbps/CBR], HN [9Mbps/VBR], HE [6Mbps/VBR]	XP [10 Mbps/VBR], SP [5 Mbps/VBR], LP [2.5 Mbps/VBR]	XP [10 Mbps/VBR], SP [5 Mbps/VBR], LP [2.5 Mbps/VBR]
Audio Recording System	Dolby Digital/5.1ch or 2ch	Dolby Digital (2ch)	Dolby Digital (2ch)
INTERFACES			
AV	Out (AV Multi)	Out (AV Multi)	Out (AV Multi)
S-Video	—	Out (AV Multi)	Out (AV Multi)
HDMI	Out	—	—
Microphone (stereo mini)	—	Yes	—
Headphones	—	—	—
DV Input/Output (IEEE1394)	—	—	—
USB	Hi-Speed USB (USB 2.0) [miniB]	2.0 Hi-Speed USB (USB 2.0) [miniB]	D220: 2.0 Hi-Speed USB (USB 2.0) [miniB] D160: —
Video Component	Out	—	—
Accessory Shoe	SD1: — DX1: Cold	Cold	D220: Cold D160: —
STANDARD ACCESSORIES			
AC Adaptor	Yes	Yes	Yes
AC Cable	Yes	Yes	Yes
DC Cable	Yes	Yes	Yes
Battery Pack	Lithium - Ion	Lithium - Ion	Lithium - Ion
Video Component Cable	Yes	—	—
AV Cable	AV Multi	AV/S Multi	AV/S Multi
Lens Cap	—	Yes	Yes
IR Remote	Yes	Yes	—
PC Cable	USB	USB	—
SD Memory Card	SD1: 4GB DX1: —	—	—
CD-ROM	SD1: HD Writer Ver 1.0E for SD1 DX1: —	DVD-Movie AlbumSE 4.3 DVDfunSTUDIO 2.5	—
Disc Cleaning Cloth	SD1: — DX1: Yes	—	—

	 Hard Disk/ SD Card Video Camera		
	SDR-H250/SDR-H20	NV-GS230	NV-GS60
GENERAL			
Power Supply	DC7.9 V/7.2 V	DC7.9 V/7.2 V	DC7.9 V/7.2 V
Power Consumption	H250: 5.7 W H20: 4.4 W	3.5 W (EVF)/3.7 W (LCD)	2.5 W (EVF)/3.1 W (LCD)
Weight (w/o Battery)	H250: 450 g H20: 430 g	410 g	450g GS60: 410g
Dimensions(W x H x D)	70.1 x 73 x 120.8 mm	GS230: 71 x 72.5 x 122.9 mm	82 x 69 x 120 mm
Media	30GB HDD-SDHC/SD Memory Card	miniDV-SDHC/SD Memory Card	miniDV
LENS SECTION			
Image Sensor	H250: 1/6" CCD x 3 (800 k x 3 pixels, Total/630 k x 3 [4:3], 540 k x 3 [16:9] (Moving Picture)/710 k x 3 [4:3], 540 k x 3 [16:9] [Still Picture] H20: 1/6"CCD (800 k pixels, Total/400 k [4:3], 540 k [16:9] (Moving Picture)/410 k [4:3], 550 k [16:9] [Still Picture] Effective)	1/6" CCD x 3 (800 k x 3 pixels, Total/400 k x 3 [4:3], 460 k x 3 [16:9] (Moving Picture)/ 530 k x 3 [4:3] [Still Picture] Effective)	1/6" CCD (800 k pixels, Total/400 k [4:3] (Moving Picture))
F Value	H250: F1.8 (WIDE)/F2.8 (TELE) H20: F1.8 (WIDE)/F3.7 (TELE)	F1.8 (WIDE)/F2.8 (TELE)	F1.8 (WIDE)/F3.9 (TELE)
Optical Zoom	H250: 10 x Variable Speed Zoom H20: 32 x Variable Speed Zoom	10 x Variable Speed Zoom	30 x Variable Speed Zoom
Focal Length	H250: 3.0—30.0 mm H20: 2.3 — 73.6 mm	2.45—24.5 mm	1.9—57.0 mm
Filter Diameter	37mm	37 mm	30.5 mm
35mm Film Camera Equivalent	H250: 46.1 mm—461 mm [4:3]/47.1 mm—471 mm [16:9] (Moving Picture) 43.4 mm—434 mm [4:3]/47.0 mm—470 mm [16:9] [Still Picture] H20: 44.0 mm—1408 mm [4:3]/36.0 mm—1152 mm [16:9] (Moving Picture) 43.3 mm—1386 mm [4:3]/35.3 mm—1130 mm [16:9] [Still Picture]	47.1—471 mm [4:3] (Moving Picture) 41.1—411 mm [4:3] [Still Picture]	35.7—1072 mm
Lens Brand	H250: Leica Dicomar H20: Panasonic	Panasonic	Panasonic
CAMERA SECTION			
Minimum Illumination	H250: 1 Lux (Colour Night View) H20: 2 Lux (Colour Night View)	1 Lux (Colour Night View)	2 Lux (Colour Night View)
Focus	AF/Manual	AF/Manual	AF/Manual
White Balance	Auto (with IR Sensor)/Indoor/Outdoor/Manual/White Set	Auto/Indoor/Outdoor/White Set (with IR Sensor)	Auto (with IR Sensor)/Indoor/Outdoor/Manual/White Set
High-Speed Shutter	H250: 1/50—8000 (Moving Picture), 1/25—2000 [Still Picture] H20: 1/50—8000 (Moving Picture), 1/50—500 [Still Picture]	Tape Mode: 1/50—1/8000sec. Card Mode: 1/25—1/500 sec.	Tape Mode: 1/50—1/8000 sec.
Iris	Auto/Manual	Auto/Manual	Auto/Manual
Scene Mode	Sports/Portrait/Low Light/Spot Light/Surf & Snow	Sports/Portrait/Low Light/Spot Light/Surf & Snow	Sports/Portrait/Low Light/Spot Light/Surf & Snow
Backlight Compensation	Yes	Yes	Yes
EVF	—	0.33" Colour (113 k pixels)	0.33" Colour (113 k pixels)
Monitor	2.7" Wide LCD (123 k pixels)	2.5" LCD (113 k pixels)	2.5" LCD (105 k pixels)
Microphone	Stereo Zoom Mic, Wind Noise Reduction	Stereo Zoom Mic, Wind Noise Reduction	Stereo Zoom Mic, Wind Noise Reduction
Date Recording	Auto Date (in Date Code)	Auto Date (in Date Code)	Yes
Fade Colour	—	Black/White	Black/White
Rec. Review	—	Yes	Yes
OSD Language	English/German/French/Italian/Dutch/Swedish/ Spanish/Polish/Czech/Turkish	English/German/French/Italian/Dutch/Swedish/Spanish/ Polish	English/German/French/Italian/Dutch/Swedish/ Spanish/Polish/Czech
Image Stabilizer	O.I.S.	E.I.S. (Electronic Image Stabiliser)	E.I.S. (Electronic Image Stabiliser)
Digital Zoom	H250: 25 x—700 x H20: 32 x—1000 x	10 x—500 x	30 x—1000 x
LED Video Light	H250: Yes H20: —	—	—
Flash	—	—	—
LCD Panel Light	—	Yes	—
WEB Camera Function	—	Motion JPEG 320 x 240 approx. 6 fps	—
CARD SECTION			
Card Slot	SDHC/SD	SD	—
Still Picture	H250: JPEG Picture size 1920 x 1080 [16:9] 2.0 MEGA or 1280 x 960 [4:3] 1.0 MEGA or 640 x 480 [4:3] 0.3 MEGA H20: JPEG Picture size 640 x 480 [4:3] 0.3 MEGA or 640 x 360 [16:9] 0.2 MEGA	JPEG Picture size 1760 x 1320 [4:3] 2.3MEGA or 1280 x 960 [4:3] 1.0 MEGA or 640 x 480 [4:3] 0.3 MEGA	—
DPOF	Max 999 stills	Max 999 stills	—
Consecutive Photoshot	—	10 stills with 0.5sec. interval, 0.3 MEGA	—
PictBridge	Yes	Yes	—
RECORDING SECTION			
Format	MPEG2 (Moving Picture)	DVC-SD	DVC
Recording Mode	XP (10 Mbps/VBRI), SP (5 Mbps/VBRI), LP (2.5 Mbps/VBRI)	SP/LP	SP/LP
Playback Mode	XP (10 Mbps/VBRI), SP (5 Mbps/VBRI), LP (2.5 Mbps/VBRI)	SP/LP	SP/LP
Variable Speed Search	—	Max. 20 x Speed	—
Audio Recording System	HDD: Dolby Digital (2ch) SD: MPEG1 AudioLayer2	PCM 12 bit 4 ch/ 16 bit 2 ch	PCM 12 bit 4 ch/ 16 bit 2 ch
Audio Dubbing	—	Yes	—
Counter	Yes	Time Code	Time Code
INTERFACES			
AV	Out (AV Multi)	Out	Out
S-Video	Out (AV Multi)	Out	—
Microphone (stereo mini)	—	es	—
Headphones	—	HP Out or AV Out	—
USB	2.0 High-Speed (mini B)	2.0 High-Speed (mini B)	Full-Speed (mini B)
DV Input/Output (IEEE1394)	—	In/Out	In/Out
Accessory Shoe	—	Cold	—
STANDARD ACCESSORIES			
AC Adaptor	Yes	Yes	Yes
AV Cable	AV/S Multi	AV 4pin	AV 4pin
Battery Pack	Lithium-Ion	Lithium-Ion	Lithium-Ion
Shoulder Strap	—	—	—
IR Remote	H250: Yes H20: —	Yes	—
Lens Cap	H250: — H20: Yes	Yes	Yes
Memory Card	512 MB	—	—
PC Cable	USB	USB	—
CD-ROM	ImageMixer3	SweetMovieLife 1.0E MotionDV STUDIO 5.6E LE for DV	—

Jack McCoy - Legendary Surf Film Maker



Filmmaker Jack McCoy is known for his spectacular land and water photography that includes surfing, ocean waves, sunsets, time lapse, dolphins and whales and coastal scenes.

He has produced, directed and photographed 23 feature and short films on surfing, including the award winning Storm Riders, The Green Iguana, Billabong Challenge, Occy the Occumentary, TO'Day of Days and Blue Horizon.

Blue Horizon, starring Andy Irons and Dave Rastovich has received the 2004 Surfer Magazine Award for Best Cinematography and also picked up the award for best Reportage Documentary at the 22nd Sports Movies and Television International Festival in Milan, Italy.

His 1984 windsurfing film Tradewind is considered a classic among wave sailors, and his award winning short films, Kongs Island, Rhythm of the Sea and A Day in the Life of Wayne Lynch are still being shown around the world. He was part of the photographic team that worked with Bruce Brown on 'The Endless Summer II'.



Jack filming 'Blue Horizon' in Tahiti

Jack McCoy talks about compact 3CCD technology

"I've been shooting my movies on pro cameras for many years and have now added a 3CCD compact model to my repertoire. I find the 3CCD technology is of the highest quality, which is what I demand in a small, lightweight documentary camera."

"While I use a broadcast 3CCD camera as my main video camera for surfing shots, I use my compact Panasonic camcorder for everything from set up shots to quick grabs that you go for in the documentary style of photography. Shooting from the hip means you are ready to capture what is happening, when it's happening."



Jack films Taj Burrows from a jet ski in 'Blue Horizon'

"I have used the compact 3CCD during the shooting of my new production 'Free as a Dog', starring world ranked surfer, Joel Parkinson. The combination of the 3CCD system, Leica lens and O.I.S. allowed us to fully capture the spectacular beauty of the and water locations in the film."

"The 3CCD camera system used in this compact model is the type used in professional video cameras. Individual CCDs are used to reproduce the red, green and blue colours that compose an image - so you get more vivid, true-to-life images."

Rex Pemberton - Young Aussie Adventurer

Rex Pemberton has completed his 'Seven Summits' quest, taking him into the record books as the youngest Australian to climb seven of the highest peaks over the four corners of the globe, in less than two years.

Already the youngest Australian to summit Everest and having conquered five of the seven summits, Rex has now completed his bid to climb the highest mountain on every continent.

Accompanying Rex on his quest was a Panasonic 3CCD SD video camera. This model is light and compact, weighing just 243g (without battery). It was easily carried in Rex's pocket to shoot MPEG2 video directly to SD cards for downloading to computer once he returned to base camp.



Rex explains: "I was shooting footage for a documentary on the 'Seven Summits' expedition. The camcorder's small size meant it can easily be carried right to a summit and kept secure, warm and accessible in a jacket pocket. Weight is really important on a solo climb – for example at Mt McKinley I had to carry around 100 kilos of gear and supplies. Also, as the camcorder doesn't use moving parts to tape, it is more resilient to the rigours of a climb."

"It shoots in 16:9 and uses a 3CCD camera system, so it's got the ideal combination of a great picture and compact size for this expedition. I find the 3CCD technology is of the highest quality, which is what I demand in a small, lightweight documentary camera."

"The O.I.S. system compensates for handshake when shooting video. This is great for telephoto shooting. The image is much smoother, plus if you are tracking or following someone and walking while shooting, it takes a lot of the movement out of the image. This is especially important for all of the hand held shots that make up such a large portion of my productions."

The Seven Summits

1. Mt Kosciuszko 2228m Australia
2. Vinson Massif 4897m Antarctica
3. Mt Elbrus 5633m Russia
4. Mt Kilimanjaro 5963m Africa
5. Mt McKinley 6195m USA
6. Mt Aconcagua 6962m
7. Mt Everest 8848m Nepal



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